

CLAIMS

What is claimed is:

1. A microconcentrator comprising a at least one microchannel formed on a substrate, at least one heating element, and at least one absorbing layer disposed in said microchannel wherein analytes are sorbed on said absorbing layer and desorbed by application of heat from said heating element.

2. A microconcentrator according to claim 1 said heating element comprising a resistive layer selected from the group consisting of metal, metal alloys, composites of organic conducting polymers and metals and organic conducting polymers; and implanted ions.

3. A microconcentrator according to claim 1 said absorbing layer selected from the group consisting of polymer film, sorbent materials or carbon based sorbents.

4. A microconcentrator according to claim 1 said absorbing layer comprising gas chromatography stationary phase.

5. A microconcentrator according to claim 1 said substrate comprising silicon.

6. A microconcentrator according to claim 1 said substrate comprising glass or quartz.

7. A microconcentrator according to claim 1 said substrate comprising a polymer.

8. A microconcentrator according to claim 1 said substrate comprising an oriented, boron doped, single side polished silicon wafer.

9. A microconcentrator according to claim 1 further comprising a sealing layer disposed over said microchannel.

10. A microconcentrator according to claim 9 said sealing layer comprising a second microchannel comprising a mirror image of the first microchannel disposed over said first microchannel.

11. A microconcentrator according to claim 1 further comprising a further layer disposed on said resistive layer, said further layer selected from the group consisting of polymers, ceramics and glass.

12. A microconcentrator comprising a microchannel, said microchannel further comprising a microheater, said microheater comprising a resistive layer formed in said microchannel, said microconcentrator further comprising a sealing layer formed over said microchannel and an absorbing layer formed between said resistive layer and said sealing layer.

13. The device according to claim 12 said resistive layer selected from the group consisting of metal, metal alloys, composites of organic conducting polymers and metals and organic conducting polymers; and implantated ions.

14. The device according to claim 12 said microchannel comprising a channel formed on a substrate said substrate selected from the group consisting of silicon, quartz, borosilicate wafers, and polymers.

15. A device according to claim 12 further comprising a glass layer disposed on said resistive layer.

16. A method for fabricating a microconcentrator comprising the steps of:
providing a substrate;
patterning said substrate;

forming a channel in said substrate;
forming a resistive layer in said channel;
forming an absorbent layer in said channel; and
forming a sealing layer over said channel.

- 5 17. The method according to claim 16, said step of forming said channel comprising etching said substrate.
18. The method according to claim 16, said step of forming said resistive layer comprising ion implantation.
19. The method according to claim 18, said ion implantation step comprising
10 implanting in said channel boron.
20. The method according to claim 16, said step of forming said resistive layer comprising forming a metal, metal alloy, organic conducting polymer or polymer-metal composite in said channel.
21. The method according to claim 16 said step of forming said resistive layer
15 comprising sputtering aluminum or an alloy thereof in said channel.
22. The method according to claim 16 comprising the further step of applying a layer of glass over said resistive layer.
23. A device comprising a microconcentrator according to claim 1 and a sensor formed on a substrate.
- 20 24. The device according to claim 23 further comprising a micropump.
25. The device according to claim 23 further comprising a gas chromatography separator.

26. The device according to claim 23 said substrate comprising a single silicon wafer.

27. The device according to claim 1 comprising a gas chromatograph injector.

28. A microconcentrator comprising a heating element a sealing layer formed over
said heating element and an absorbing layer formed between said heating element and
said sealing layer.

29. A sensitivity enhancer for a sensor, a sensor array, detector or gas chromatograph
comprising a microconcentrator according to claim 1.

30. An injector for sensors, sensor arrays, detectors and gas chromatographs
comprising a microconcentrator according to claim 1.

31. A modulator in two dimensional gas chromatography and comprehensive two
dimensional gas chromatography comprising a microconcentrator according to claim 1.